



TOWN OF ARLINGTON
MASSACHUSETTS

Mystic Riverfront Restoration



Mystic Riverfront Restoration

Prepared by:
Wayne Chouinard, Town Engineer
and
Corinna Beckwith, Conservation Administrator

Contributions by David Fields, Kurt Kelley, Cathy Garnett, Susan Chapnick and Janine White

January, 2016



TOWN OF ARLINGTON MASSACHUSETTS

Mystic Riverfront Restoration

Contents:

Introduction and Abstract

Section 1: Grant Application

Figures

A.1 Project Locus

A.2 Environmental Justice map

B.1 Sketch plan

B.2 Sediment Control

B.3 Existing Resources

B.4 Proposed Resources

B.5 Standard Details

B.6 Planting Plan

B.7 through B.9 Planting Details

C.1 Existing Stormdrains

D.1 through D.5 Existing Condition photographs

E.1 and E.2 Historic photographs

F.1 through F.3 Example Project: Meadowbrook Park Restoration

Section 2: Project Work and Cost Plan

Section 3: Key Personnel Resumes

Section 4: Letters of Commitment from Project Partners

Section 5: Letter Confirming Site Access

Section 6: Conflict of Interest Guidance and Disclosure Statement

Section 7: Commonwealth of Massachusetts Standard Contract Form

Section 8: Commonwealth Terms and Conditions

Section 9: Request for Taxpayer Identification Number and Certification

Section 10: Authorized Signatory Listing

Section 11: EFT form

CD Disc copy



TOWN OF ARLINGTON MASSACHUSETTS

Mystic Riverfront Restoration

Introduction:

The Arlington Conservation Commission on behalf of the Town of Arlington is requesting a Natural Resource Damages (NRD) Assessment and Restoration Program Grant for a restoration project along the Upper Mystic River that will restore and improve the natural resources that were injured by release of No. 2 fuel oil associated with the J. P. Noonan site in Arlington.

Abstract:

The Town of Arlington proposes to restore and enhance a portion of the Upper Mystic Riverfront by creating a native riverbank (riparian) habitat and improving stormwater quality at an existing outfall along Segment MA71-02 of the Mystic River, which was affected by the 2013 Mystic River Oil Spill. The proposed Mystic Riverbank Restoration project is located along the river at the end of Park Street in the Town of Arlington and was directly impacted by the 2013 heating oil release. The spilled oil was removed from the surface water, and oil-soaked moss and other oil-covered plant debris were removed from the riverbank during the remediation effort.

The proposed Restoration project will provide slope stabilization along the riverbank, enhance the natural ecosystem, and help to improve water quality of the river. The Restoration project will include direct involvement from the surrounding environmental justice (EJ) community during construction of the riparian habitat creation, and will include the placement of educational signage along the existing adjacent footpath.

In addition to the restoration and enhancement of the riverbank habitat and the drain pipe outfall improvements, the Town of Arlington has agreed to fully fund the installation and maintenance of a new pretreatment system for the storm drain pipe. This related project will capture oils, sediment, and litter to reduce contamination and sedimentation in the Mystic River. The combination of these two projects will provide for the sustainable restoration of the Upper Mystic River Bank and the improvement of local water quality.

with applicable state and federal regulations prior to or concurrent with the completion of the restoration project.

Is the Applicant aware of information suggesting that the property where the project is to occur may be potentially contaminated with solid waste as defined in the Site Assignment Regulations for Solid Waste Facilities at 310 CMR 16.00?

☐ Yes ☒ No ☐ Unknown

If yes, please briefly describe:

Site Description:

The project site is located within the eligible geographic focus area of the NRD for the Upper Mystic River Restoration Grant (Segment MA71-02). The site is immediately adjacent to the Upper Mystic River and consists of a wooded bank and mown grass upland with a stone dust path along the river. The site is located within the 100-year floodplain. The Upper Mystic River flows fairly slowly except during storm events when high flows can occur and flooding often becomes a problem in the area. This area was directly impacted by the 2013 Oil Spill. During the remediation effort, oil-soaked moss and oil-soaked plant debris were removed from this riverbank location.

The general area around the proposed project location was historically used as farmland due to its productive floodplain soils. Historic photos show the local floodplain in this reach of the Upper Mystic River (See Figures E.1 and E.2) has transformed from a tidal high estuarine system with shifting bars and cuts, to a freshwater system with high fill embankments. This has occurred since the construction of the Amelia Earnhardt dam (downstream) in Somerville, MA. After World War II, this surrounding area was converted to residential housing. The adjacent neighborhoods currently house Environmental Justice (EJ) communities in both income and diversity (See Figure A.2: EJ Map).

Pedestrians and bicyclists utilize the existing stone dust path within the project limits for both recreational and commuting purposes. This reach of the river is also used for recreational boating.

The aquatic habitat includes native vegetation (mainly water lily) and some invasives (water chestnuts). Numerous birds (water fowl and birds of prey, including owls and eagles), fish (including River Herring, whose numbers have increased recently due to a fish ladder), amphibians, reptiles, and small mammals inhabit or pass through this reach of the river.

The US Environmental Protection Agency (EPA) gave the Upper Mystic River a water quality rating of B+ in the 2014 Water Quality Report (<http://mysticriver.org/2014waterqualitygrade/>).

This rating indicates that 80-85% of the time between 2012 – 2014 the waterbody met swimming and boating standards. The Mystic River Watershed Association (MyWRA) also published details on the analysis of water quality for the Mystic River Watershed area (<http://rpubs.com/walkerjeffd/myrwa-epa-grade-2014>) and noted that the Upper Mystic River is impaired as a result of many storm drain outfalls that are a source of contamination (e.g., Polyaromatic hydrocarbons (PAHs), heavy metals, total phosphorus) from urban stormwater runoff (<http://mysticriver.org/watershed-issues/>). This is consistent with MassDEP studies (<http://www.mass.gov/eea/docs/dep/water/resources/71wqar09/71wqar09.pdf>).

There is an existing stormwater outfall in poor conditions within the project limits. The drain pipe no longer discharges through the concrete headwall and as a result has significantly eroded the river bank. The drainage system that discharges at this location is approximately 100 years old and collects stormwater runoff from the Park Street and Beacon Street residential neighborhoods of Arlington (see Figure C.1). In its current state, the broken drain pipe causes water to hit the concrete headwall and wash back, resulting in a cycle of backwash erosion that worsens the damage and further erodes the riverbank. Figures D.1 through D.5 show photographs of existing site conditions and vegetation.

Project Description:

Project Summary

The Town of Arlington is seeking funding to restore and enhance a portion of the Upper Mystic Riverfront by creating a native riparian habitat, installing native plants, and improving stormwater quality at an existing outfall within the geographic area affected by the 2013 Mystic River Oil Spill. The proposed Mystic Riverbank Restoration project is located along the river at the end of Park Street in the Town of Arlington and was directly impacted by the 2013 heating oil release, within the Upper Mystic River Segment MA71-02. The Town of Arlington will contribute by funding the addition of a new stormwater pretreatment system upstream of the outfall to ensure the success of this project. Figures B.1 through B.9 show the proposed bank restoration, outfall improvements, and planting plan.

The Town of Arlington stormwater outfall (No. OF-035000, on Plate IX, see Figure C.1) discharges stormwater runoff from the Park Street and Beacon Street residential neighborhoods. The outfall currently discharges directly into the Upper Mystic River with only minimal stormwater treatment (e.g. street sweeping, catch basin sumps). The drain pipe no longer flows through the broken concrete headwall and has resulted in considerable backwash erosion. This will continue to cause increasing damage to the outfall and erosion of the riverbank.

The project proposes removal of the broken headwall and pipe sections and the installation of a new flared-end pipe section, sediment forebay, and stone-lined vegetative swale. Stormwater will discharge to a proposed native riparian habitat prior to discharging to the river. The proposed project will improve stormwater quality at this outfall and stabilize the riverbank within the project limits. The addition of an upstream pretreatment chamber for the

stormwater drainage system (a separate and fully-funded project by the Town of Arlington) will further improve stormwater quality, and therefore the water quality of the Upper Mystic River.

Implementation of Proposed Riverfront Restoration Project

Several pipe sections and portions of the headwall at the stormwater outfall (No. OF-035000) to the Upper Mystic River are heavily damaged. This damage contributes to a cycle of backwash erosion of the Mystic River riverbank—water discharging through the broken and eroded pipe hits the broken concrete headwall and bounces back against the riverbank, eroding the bank.

The last pipe sections, including the broken end of pipe at this outfall, will be removed along with the broken concrete headwall (20 ft long, 3 ft high, and 2 ft wide at base). In its place, a new flared-end pipe section will be installed with riprap outlet protection (See Figure B.1). This will eliminate backwash erosion, making the restoration project sustainable, and increase the area available to construct the sediment forebay and new riparian habitat. The stormwater flow path will meander through the new riparian habitat (sediment forebay and stone-lined vegetated swale) increasing this area's potential to act as a buffer for chemical and nutrient input to the Mystic River at this location, thereby restoring beneficial uses to this part of the riverbank for the ecosystem and community.

The construction of the new riparian habitat will involve excavation of soil along 20 feet of the riverbank, with a width of 25 feet and a depth of approximately 3 feet (Figure B.1). The exposed slopes would be seeded with native grasses (e.g., wetland seed mix) and planted with native shrubs (e.g., dogwood, willow) to stabilize slopes quickly. Live-stake fascines may also be used to provide slope stabilization. Approximately 5 to 8 trees will be planted in the new wetland habitat (such as silver maple, black willow, cottonwood, yellow birch). After one growing season of observation of the water regime, an appropriate understory would be planted, either wetland emergent plants (e.g., *Juncus*) or drier herbaceous understory plants (ferns). The newly created riparian habitat would be approximately 500 sf (20 feet x 25 feet) in size with 2:1 side slopes and oriented slightly upstream of the connection to the Mystic River as depicted in Figure B.1. The planting plan for the new riparian habitat is shown in Figure B.6. Planting details - including the number and types of plants and locations for native vegetation plantings - are shown in Figures B.7 through B.9.

The two large existing granite curb blocks that protect the existing shore of the Mystic River at this location will remain in place. Other bank areas may be stabilized with additional granite blocks (recycled from Broadway Plaza in Arlington Center), as needed.

The existing footpath within the project location will be redirected to the west to go around the new riparian habitat area as shown in Figure B.1. Educational signage on the background, purpose, and importance of the restoration and enhancement project will be created and installed along the footpath. In addition, the Town of Arlington will use recycled granite blocks, recently removed from Arlington Center, to create bench seating along the footpath for the community to enjoy the view of the new riparian habitat along the riverfront.

As previously mentioned, the Town of Arlington will fund the installation and maintenance of a stormwater pretreatment chamber. This part of the project is included in this proposal's budget for informational purposes only – no additional budget is requested for the Town's contribution to this project. The pretreatment chamber will be installed under the intersection of Coral Street and Park Street, and will not impact the existing large tree at the corner of Park Street and Mystic Valley Parkway. The pretreatment chamber will contribute greatly to the sustainability of the proposed restoration project. It will remove oil, sediment, and trash debris prior to discharging to the new riparian habitat area and the Mystic River.

Benefits to the Natural Resource and Services

In addressing stormwater runoff and riverbank erosion, this project presents a sustainable solution to improving water quality and the local ecosystem. Creating a native riparian habitat will help to stabilize the riverbank slope, reduce sediment inundation to the stream system, increase groundwater recharge, and buffer chemical and nutrient uptake (Mitsch and Gosselink, 1993, Wetlands, 2nd Edition, Van Nostrand Reinhold, NY). Additionally, the variety of proposed native plants will help support the productivity and diversity of the local ecosystem. The improvements to the outfall at this site, including the separately funded pretreatment chamber, will also reduce debris, oils, and sediment entering the Mystic River at this location. In its entirety, this project will support the improvement of water quality and encourage the sustainable and long-term restoration of the Upper Mystic River, while creating a new native riparian habitat for community involvement and enjoyment.

Community Involvement Plan, EJ and Stewardship

The proposed project includes an active community outreach initiative. The neighborhood of this proposed project is an EJ community (minority and income) as shown in Figure A.2. Involvement will include educational signage along the footpath adjacent to the riverbank and public engagement efforts in the implementation and stewardship of the riparian habitat. Educational signage will be generated in association with the Arlington Conservation Commission and placed along the footpath to explain what happened (the oil spill), how it was cleaned up and restored (this Riverbank Restoration), and what made this possible (the DEP NRD grant).

To promote a positive and sustainable public relationship with the neighborhood adjacent to the proposed riverbank restoration, several community groups have been contacted to participate in the planning and implementation of the new habitat (see partner letters and letters of support included in Section 4).

- The Hardy Elementary School in Arlington, MA, located within 1 mile of the project, has agreed to be a community partner for this Riverfront Restoration project, to have students be involved in planting native vegetation and creating materials to inform the community of the project and its benefits. This school district includes an EJ minority area.
- MyWRA, who is very active in monitoring water quality and promoting the importance of environmental stewardship of the Mystic River watershed area, has provided the Town of

Arlington with a very strong letter of support for the proposed Mystic Riverfront Restoration project.

- Letters of support have also been obtained from the Arlington Land Stewards, the Arlington Garden Club, and the Arlington High School Environmental Club SAVE. The groups also offer to assist in the planting project and to foster a caretaker role through public involvement for sustainability of the restoration.

Project Management Experience

The Town of Arlington is confident that the proposed project will be managed, implemented, and maintained effectively, as the Town has direct experience with wetland restoration and the proposed project manager, Wayne Chouinard, Engineer, Town of Arlington, is highly qualified to ensure the success of this program. For example, under the direction of the Town Engineer, the Arlington Conservation Commission, the Arlington Open Space Committee, and an outside consultant, a portion of the wetland near the Lower Mystic Lake in Meadowbrook Park, Arlington, was restored by the Town in 2001 to improve the natural capacity for fish and wildlife habitat, water quality attenuation functions, and other wetland functions. This project was supported and funded by the Arlington Conservation Commission under a Community Development Block Grant, by the Massachusetts Wetlands Restoration and Banking Program under a GRO Wetlands Grant, and by the U.S. Fish and Wildlife Service under a grant from the Partners for Wildlife Program. This restoration included removal of invasive plants (the common reed grass, *Phragmites australis*), excavation of a portion of the wetland to create a deep marsh, creating hummocks with the excavated material, and replanting the wetland with a diverse native tree and shrub cover. Plantings included red maple, swamp white oak, black willow, buttonbush, and spicebush, as well as herbaceous species such as soft-stem bulrush and arrow arum. More than 2000 trees, shrubs and emergent plants were planted by over 60 volunteers, over 4 days. Figures F.1 through F.3 show pictures from this wetland habitat restoration project.

The Meadowbrook Park wetland restoration was a much larger effort than the proposed Mystic Riverfront Restoration project and it was successfully planned and implemented in the Town of Arlington. Additionally, the Arlington Conservation Commission has coordinated several groups of community volunteers to assist in planting the proposed wetland habitat. The current Administrator of the Commission, Ms. Cori Beckwith, has successfully coordinated previous annual cleanup days to involve the community in the stewardship and sustainability of the Mystic River and its resource areas. Ms. Beckwith will be working collaboratively with the Conservation Commission and the Town Engineer for EJ community outreach and coordination of volunteer efforts in the proposed project implementation and stewardship to ensure the success and sustainability of the Riverfront Restoration project.

Permits

Since the work is entirely on DCR's Mystic Reservation property, the Town of Arlington has submitted a permit application to DCR to obtain a permit to construct this Riverfront Restoration project. The permit application was submitted to DCR on December 9, 2015 and is pending approval. DCR has verbally communicated to the Town that they support this

Riverfront Restoration project. In addition, the Town of Arlington plans to develop a maintenance Memorandum of Understanding (MOU) between the Town and DCR or obtain an easement, to ensure the sustainability of the restoration project, including: 1) invasive plant removal in the newly planted habitat area if needed, and 2) future maintenance and repair responsibilities of the riverfront restoration area (including maintenance of structures such as benches and signage). The new pretreatment chamber will be under the intersection of Carol and Park Streets in Arlington; therefore, it is in the Town's jurisdiction and will not require DCR coordination for cleaning and maintenance.

The Town is preparing a Notice of Intent (NOI) for a permit to construct this project in Arlington as it is in the jurisdiction of the Arlington Conservation Commission. Approval of the NOI application is expected in January 2016. The Arlington Conservation Committee is in support of this proposal and has been greatly involved in the oversight of the Oil Spill Cleanup and remediation to-date.

Consistency with Local Policy and Master Plan Initiatives

The proposed Mystic Riverfront Restoration project is consistent with local regulations and supports both DCR and the Town of Arlington Master Plan initiatives, as described below.

The following outlines the consistency of the proposed Mystic Riverfront Restoration project with the DCR's *Mystic River Master Plan* (2009)

1. The Master Plan calls for (on page 35) the area to have Riverfront Vegetation Plantings.
2. The Conservation Plan (pp. 77-79) states that the Recommended plan in the area of the project should:
 - a. Increase width of native riparian vegetated strip
 - b. Replant with woody cover adjacent to water
 - c. Remove invasives
 - d. Open riparian strip at intervals to allow sightlines through to river
 - e. Convert regularly mown areas to meadow
 - f. Stabilize eroding bank
3. Ongoing Operations should include (pp. 108-113) clean up days, invasive species control, nuisance species control, pruning, bank stabilization, trash and litter removal.

The following outlines the consistency of the proposed Mystic Riverfront Restoration project with the *Town of Arlington's Master Plan* (2015)

The Natural Resources and Open Space section calls for (p. 145) recommendations which:

- a. Use environmentally sustainable planning and engineering approaches for natural resource management
- b. Consider measures to encourage development projects that respect and enhance adjacent open spaces and natural resources
- c. Protect all water bodies and watersheds for both healthy ecological balance and recreational purposes.

Project Partner/Subcontractor (If applicable):

Provide the name of the firm or organization with whom you plan to partner/subcontract to complete the proposed project.

Name: Mystic River Watershed Association
Mailing Address: 20 Academy St
City/Town: Arlington State: MA Zip: 02476
Applicant website (if applicable): MysticRiver.org

Type of Entity:

- ☐ Private Individual ☒ Non-profit Organization ☐ State Government
☐ Federal Government ☐ Tribal Government ☐ Municipal Government
☐ County Government ☐ Corporation/Business ☐ Academic Institution
☐ Other (explain) _____

And:

Name: Hardy Elementary School
Mailing Address: 52 Lake St
City/Town: Arlington State: MA Zip: 02474
Applicant website (if applicable): arlingtonma.gov

Type of Entity:

- ☐ Private Individual ☐ Non-profit Organization ☐ State Government
☐ Federal Government ☐ Tribal Government ☐ Municipal Government
☐ County Government ☐ Corporation/Business ☒ Academic Institution
☐ Other (explain) _____

Project Readiness:

Provide a list of permits or regulatory approvals (local, state, or federal) that are required to complete the project and current status of each permit or approval (e.g. not yet applied, completed and ready to apply, pending, granted, denied, under appeal):

1. CONSTRUCTION PERMIT TO DCR – FILED DECEMBER 9, 2015; PENDING APPROVAL.
2. NOTICE OF INTENT (NOI) – READY TO APPLY, TO BE FILED WITH THE ARLINGTON CONSERVATION COMMISSION IN JANUARY 2016

Describe the project readiness in terms of design (e.g. conceptual, 30%, 60%, 100%):

60% DESIGN

Project Benefits:

List, in summary form, specific benefits to the community and/or neighborhood as well as short-term and long-term benefits to natural resources and/or the services they provide.

Summary of Project Benefits	
1.	Riverbank slope stabilization
2.	Water quality improvement through removal of oil, sediment, and trash from stormwater
3.	Increase groundwater recharge
4.	Velocity dissipation of stormwater outfall, by increase flow path length
5.	Increase area of higher value habitat by installation of native plantings
6.	Increased productivity and ecological diversity of riparian zone
7.	Removal of historic fill to reconnect riverine habitat to riparian wetland
8.	Community benefit & enjoyment: Participation of neighborhood Environmental Justice Communities in the native planting event and stewardship of project
(See narrative in Project Description)	

Project Potential Environmental and Socioeconomic Impacts:

Complete the attached tables to indicate the potential environmental, social, and economic impacts of the proposed project. Examples of these potential impacts are provided for your consideration when evaluating the proposed project.

CHECKLIST: POTENTIAL ENVIRONMENTAL AND SOCIOECONOMIC IMPACT

Impact Category: Environmental

Impacts on...	No Impact	Minimal Adverse Impacts	Significant Adverse Impacts	Beneficial Impacts	Temporary Short-Term Impacts	Long-Term Impacts	Mitigation Required	Does Not Apply
Air quality					X			
Instream flow	X							
Surface water quality				X				
Sediment quality				X				

Sediment quantity				X				
Soil quality				X				
Groundwater quality				X				
Wetlands quality and services/functions				X				
Diversity and abundance of aquatic species				X				
Diversity and abundance of terrestrial wildlife species				X				
Diversity of plant communities				X				
Invasive Species				X				
Other:								
Other:								

CHECKLIST: POTENTIAL ENVIRONMENTAL AND SOCIOECONOMIC IMPACT

Impact Category: Social

Impacts on...	No Impact	Minimal Adverse Impacts	Significant Adverse Impacts	Beneficial Impacts	Temporary Short-Term Impacts	Long-Term Impacts	Mitigation Required	Does Not Apply
Environmental Justice populations				X				
Sense of community and well-being				X				
Aesthetics				X				
Public health or safety				X	X			
Recreational activity				X				
Native American Trust Resources	X							
Non-tribal cultural or historic resources				X				
Education				X				
Local partnerships and collaborative efforts				X				
Availability and quality of drinking water								X
Subsistence activity								X
Nuisances								X
Other:								

CHECKLIST: POTENTIAL ENVIRONMENTAL AND SOCIOECONOMIC IMPACT
Impact Category: Economic

Impacts on...	No Impact	Minimal Adverse Impacts	Significant Adverse Impacts	Beneficial Impacts	Temporary Short-Term Impacts	Long-Term Impacts	Mitigation Required	Does Not Apply
Short-term commercial								X
Property values			X					
River or land-based recreational expenditures and related businesses								X
Existing resource-based industries								X
Commercial water users								X
River-based commercial navigation								X
Wastewater discharges								X
Stormwater discharges				X				
Other:								
Other:								

Authorizing Statement

I declare that the information included in this Application and all attachments is true, complete, and accurate to the best of my knowledge, and that the proposed project complies with all applicable state, local and federal laws and regulations.

Corinna Beckwith

Signature of Applicant

1/6/16

Date

Corinna Beckwith

Name of Applicant

Figure A.1

Project Locus

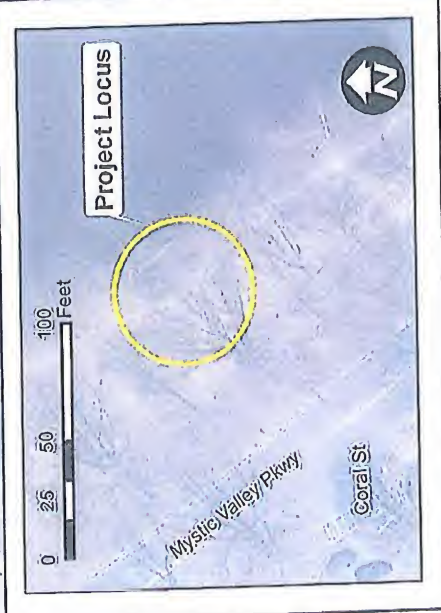
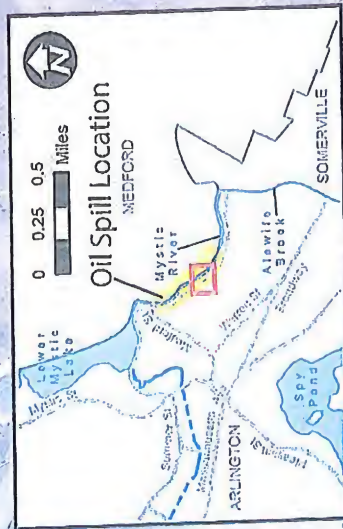
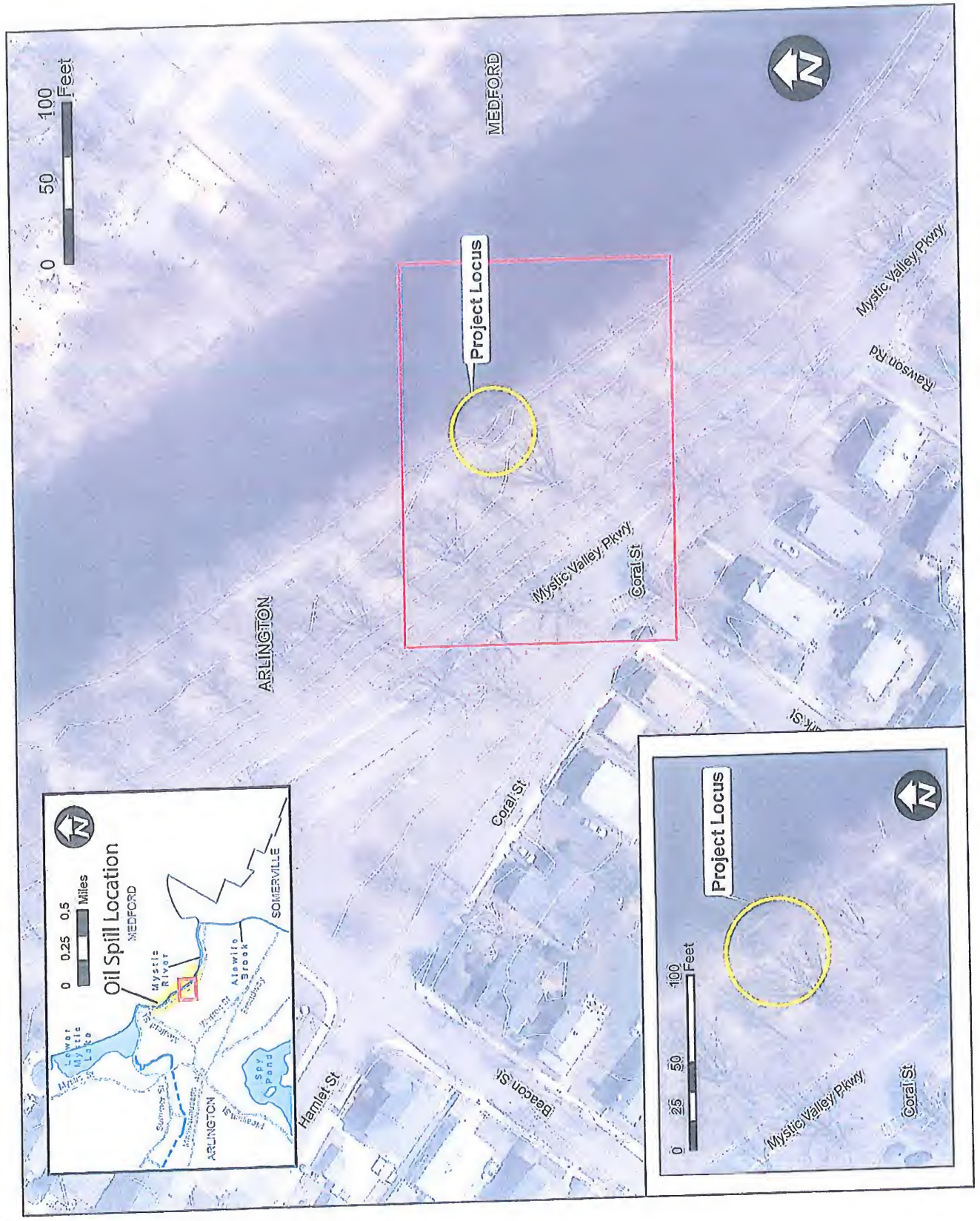


Figure A.2

Environmental Justice map

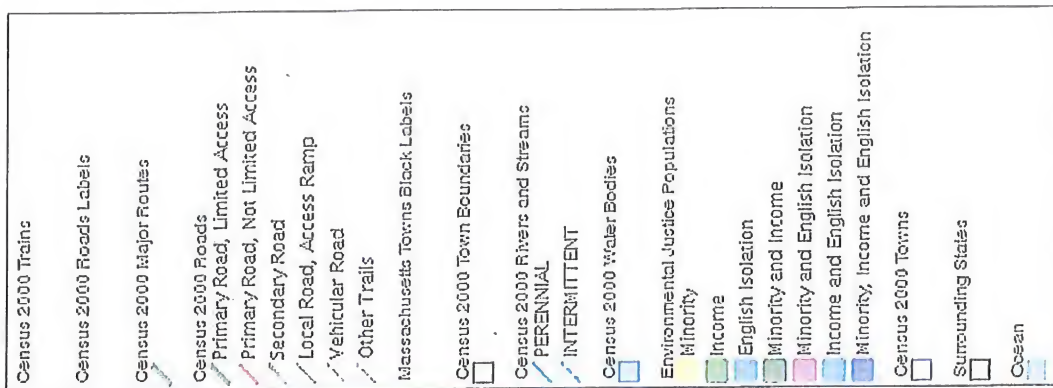
[illegible]

Figure B.1 through B.9

Sketch Plans

- B.1 Sketch Plan
- B.2 Sediment Control
- B.3 Existing Resources
- B.4 Proposed Resources
- B.5 Standard Details
- B.6 Planting Plan
- B.7 Tree Planting Detail
- B.8 Shrub Planting Detail
- B.9 Herbaceous and Stake Planting Detail

MYSTIC RIVER

EXISTING BANK

REMOVE & DISPOSE OF EXISTING HEADWALL STRUCTURE

PROPOSED EMERGENCY OVERFLOW SPILLWAY (ELEVATION = 3.25') WITH 12" RIP-RAP

PROPOSED GRANITE BLOCKS TO BE INSTALLED AS NEEDED

PROPOSED STONE LINED SWALE (SLOPE = 1%)

EXISTING PATH

PROPOSED SEDIMENT FOREBAY (BOTTOM ELEVATION = 1.65')

PROPOSED PATH

7.0'±

PROPOSED GRANITE BENCH w/ INTERPRETIVE SIGN

CUT & REMOVE EXISTING PIPE & INSTALL NEW FLARED END SECTION (ASSUMED INV. ELEVATION = 3.65')

PROPOSED SPILLWAY (ELEVATION = 2.25')

PROPOSED PRETREATMENT BAFLE TANK TO BE LOCATED OFF SITE. TO BE SITED, INSTALLED, & FUNDED BY THE TOWN OF ARLINGTON.

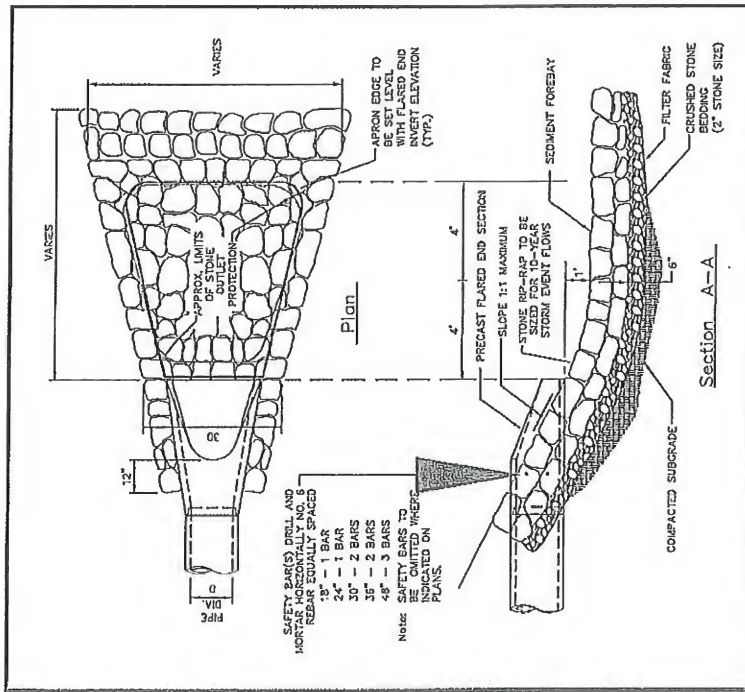
EXISTING TREE (TYP)



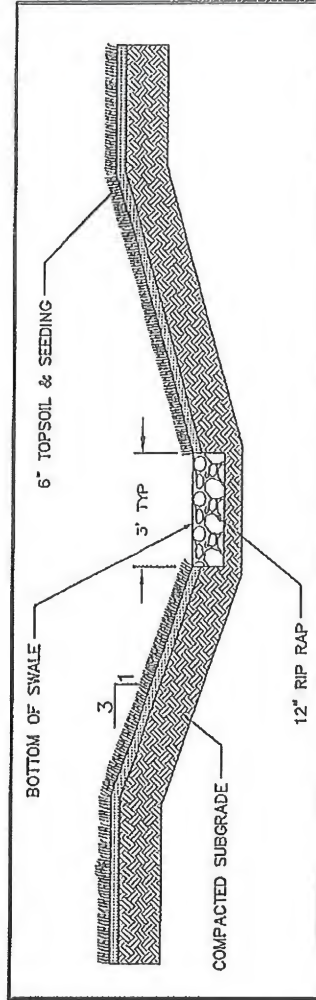
ARLINGTON

PROPOSED STORMWATER IMPROVEMENT SKETCH MYSTIC RIVERFRONT RESTORATION PROJECT

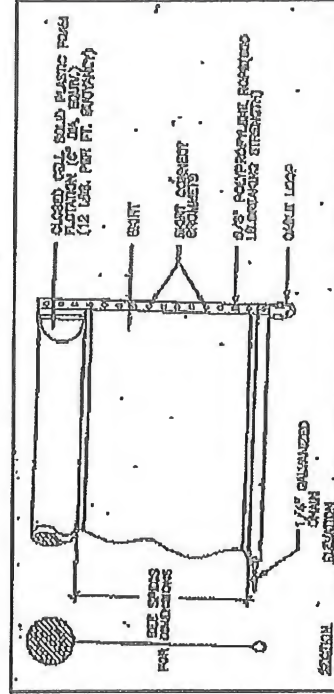
JAN 6, 2016
1"=15'
REVISION
0



TYPICAL FLARED END SECTION



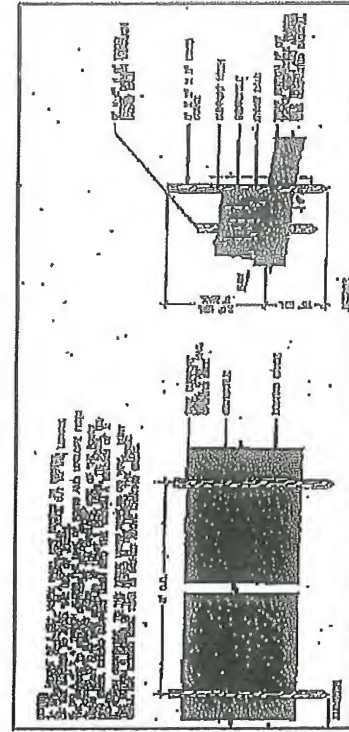
TYPICAL STONE-LINED SWALE SECTION



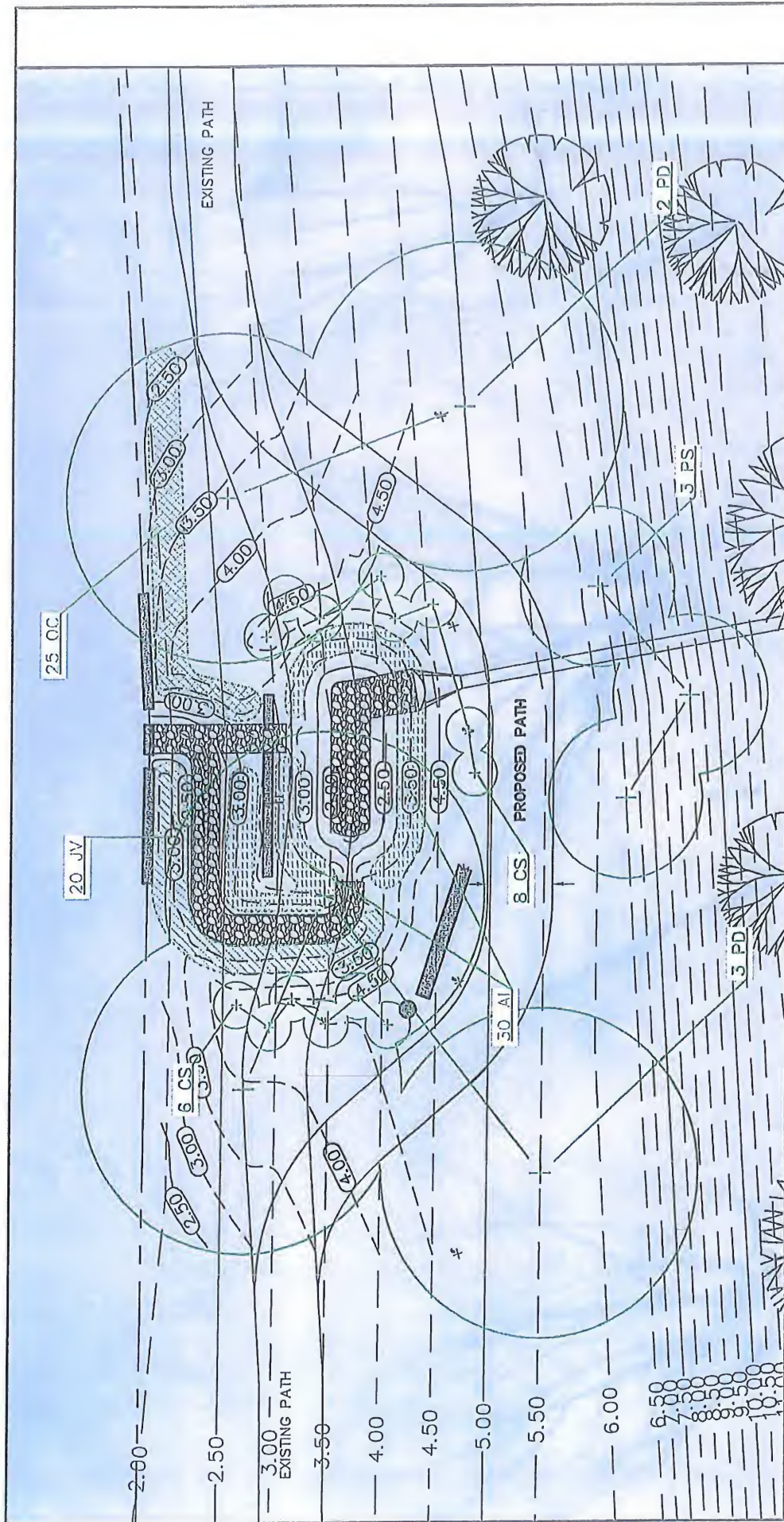
TYPICAL TURBIDITY CURTAIN

GENERAL NOTES

1. THIS PLAN HAS BEEN DEVELOPED BASED ON AVAILABLE RECORDS, AERIAL IMAGERY, AND OBSERVATIONS. ON-THE-GROUND CONDITIONS MAY VARY FROM THOSE SHOWN ON THIS SKETCH.
2. AN ON-THE-GROUND SURVEY WAS NOT CONDUCTED DURING THE PREPARATION OF THIS SKETCH.
3. ALL ELEVATIONS AND INVERTS SHOWN ARE ASSUMED AND/OR ESTIMATED FROM AVAILABLE STORMWATER DRAINAGE SYSTEM RECORDS & PLANS.
4. LOCATIONS AND DIMENSIONS OF FEATURES SHOWN ON THIS SKETCH ARE APPROXIMATE IN NATURE.
5. LOCATIONS & EXTENTS OF SEDIMENT CONTROL DEVICES AND INSTALLATION SHALL BE COORDINATED AND APPROVED BY THE TOWN OF ARLINGTON CONSERVATION COMMISSION.



TYPICAL SILT FENCE & STRAW BALES

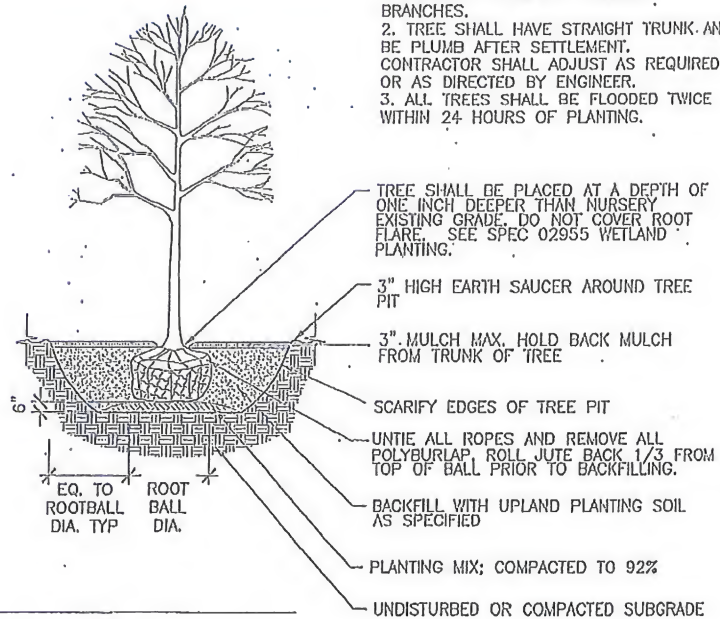




TOWN OF ARLINGTON MASSACHUSETTS

Mystic Riverfront Restoration

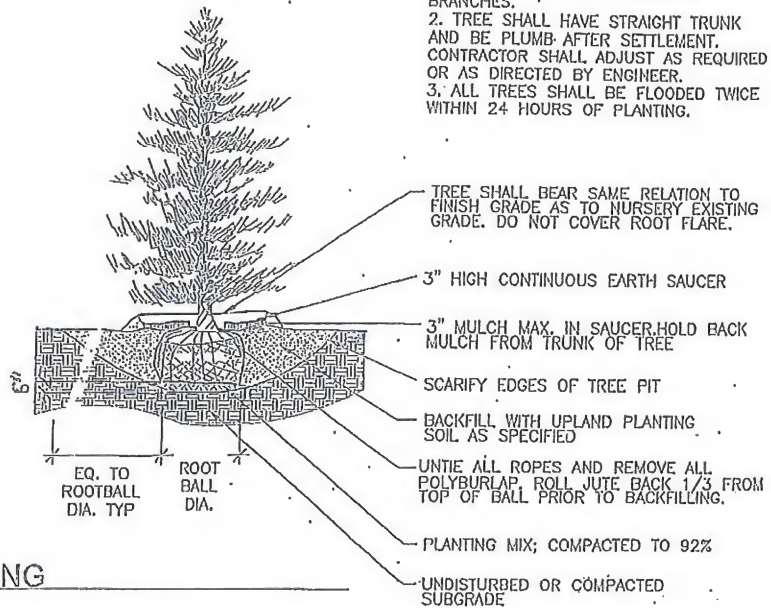
- NOTES:
1. CLEANLY PRUNE ALL DAMAGED BRANCHES.
 2. TREE SHALL HAVE STRAIGHT TRUNK AND BE PLUMB AFTER SETTLEMENT. CONTRACTOR SHALL ADJUST AS REQUIRED OR AS DIRECTED BY ENGINEER.
 3. ALL TREES SHALL BE FLOODED TWICE WITHIN 24 HOURS OF PLANTING.



DECIDUOUS TREE PLANTING

SCALE: NTS

- NOTES:
1. CLEANLY PRUNE ALL DAMAGED BRANCHES.
 2. TREE SHALL HAVE STRAIGHT TRUNK AND BE PLUMB AFTER SETTLEMENT. CONTRACTOR SHALL ADJUST AS REQUIRED OR AS DIRECTED BY ENGINEER.
 3. ALL TREES SHALL BE FLOODED TWICE WITHIN 24 HOURS OF PLANTING.



EVERGREEN TREE PLANTING

SCALE: NTS

Figure C.1

Existing Stormdrains

Figures D.1 to D.5

Existing Condition photographs

D.1-D.2	June, 2013
D.3-D.4	Dec., 2014
D.5	Jan., 2015



TOWN OF ARLINGTON MASSACHUSETTS

Mystic Riverfront Restoration



Figure D.1 Stormwater outlet 35
Photo taken June 13, 2013 after heating oil spill on May 31, 2013
Note oil collected on boom



TOWN OF ARLINGTON MASSACHUSETTS

Mystic Riverfront Restoration



Figure D.2 Stormwater outlet 35
Photo taken June 13, 2013 showing broken pipe end



TOWN OF ARLINGTON MASSACHUSETTS

Mystic Riverfront Restoration

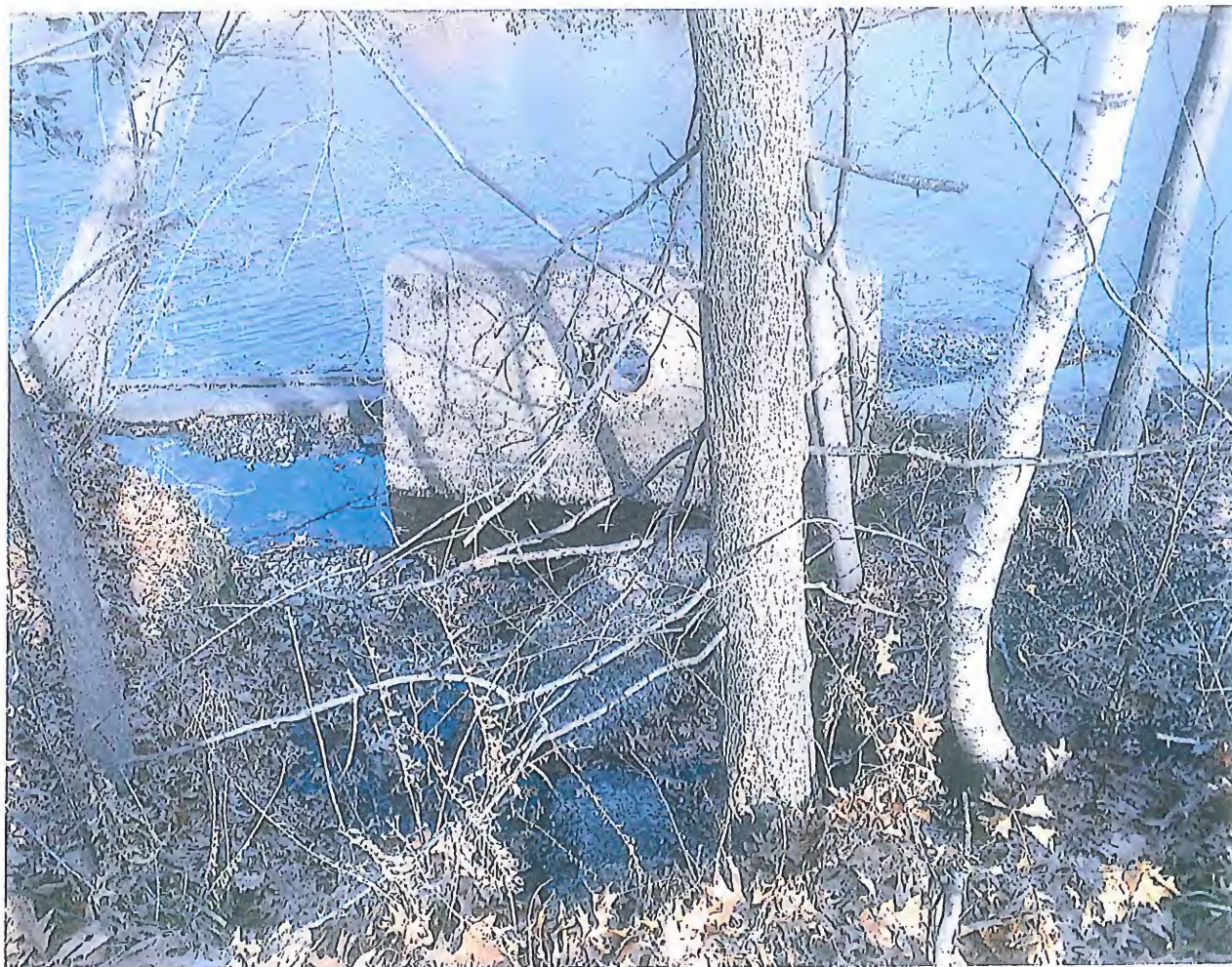


Figure D.3 Stormwater outlet 35
Photo taken Dec. 4, 2014
Disconnected headwall at the shoreline of the Mystic River



TOWN OF ARLINGTON MASSACHUSETTS

Mystic Riverfront Restoration



Figure D.4 Mystic Reservation
Photo taken Dec. 4, 2014
Area of proposed excavation



TOWN OF ARLINGTON MASSACHUSETTS

Mystic Riverfront Restoration



Figure D.5 Scour hole at broken outlet 35
Photo taken Jan. 10, 2015
Showing River Street bridge in distance downstream

Figures E.1 and E.2

Historic photographs

From 1885, and 1905

Figures 13 and 14 from The Tinkham Brothers' Tide-mill

By J.T. Trowbridge

Edited by Richard A. Duffy



TOWN OF ARLINGTON MASSACHUSETTS

Mystic Riverfront Restoration



Mystic Riverfront Restoration Project

December, 2015

Figure E.1 Mystic River in 1885 and

Figure E.2 Mystic River in 1905